

transmission-type element, they are not limited to one or the other of the identified species. For this reason, Applicants indicated that they are generic to both species.

In traversing Applicants' statement, the most recent Office Action refers to claims 1 and 7, and states that they do not include certain recitations found in claim 13 relating to polarization directions of the light beams. It is not seen how this distinction pertains to the election of species. The polarization directions of the light beams do not relate to whether the optical element is reflective or transmissive. Thus, as far as the *distinction between species A and B is concerned*, the presence or absence of terminology relating to polarization directions is of no consequence. For this reason, Applicants maintain their position that claims 13 and 23 are generic to both species.

The Office Action includes a rejection of claims 1, 13-15, 23 and 24 under 35 U.S.C. § 103(a) as allegedly being unpatentable over the Brandt patent (U.S. Patent No. 5,438,446). This rejection is respectfully traversed.

Independent claim 1 recites an optical scanner for deflecting a plurality of light beams at a given wavelength  $\lambda$  from a light source towards a surface to be scanned. The scanner includes at least one optical element having a surface which reflects the light beams, the surface comprising a thin film in which the reflectance of s-polarized light at the given wavelength and p-polarized light at the given wavelength differ by no more than 3.0% over an incidence angle in the range of 0-60°. As noted at page 10, lines 3-13, such an arrangement is beneficial, for example, because it allows reducing variations in light quantities of the beams scanned at different locations on a surface in a multi-beam

apparatus where the polarization direction of at least one light beam differs from the polarization directions of other light beams.

The Office alleges that the Brandt patent discloses an optical scanner that comprises a light source (12), a deflector (20) having facets (21), and a protective optical coating applied on each of the facets for providing relative uniformity of reflectance of P-polarized and S-polarized incident light. The Office further alleges that the recitation “the reflectance of s-polarized light at the given wavelength and p-polarized light at the given wavelength differ by no more than 3.0%” of claim 1 reads on the “relative uniformity of reflectance” disclosed in the Brandt patent. The Office acknowledges that the Brandt patent does not disclose a light source that emits a plurality of beams, but states that one skilled in the art would have been motivated to replace the Brandt light source with a multiple-beam light source to reduce scanning time.

Applicants respectfully submit that the Office’s rejection does not make out a *prima facie* case of obviousness. In particular, even if the Office’s suggested modification were made, *arguendo*, the resulting hypothetical apparatus would not render claim 1 obvious. Rather, at best, the resulting hypothetical apparatus would be an optical scanner with a plurality of beams of S-polarization, or it would be an optical scanner with a plurality of beams of P-polarization. This is because the Brandt patent does not contemplate using S-polarization light beams and P-polarization light beams together. In fact, as acknowledged by the Office, the Brandt patent does not even disclose using a plurality of light beams. Under such a construction, claim 1 would not be rendered obvious, as discussed further below. Additional comments regarding the Brandt patent are also provided below.

The Brandt patent discloses how to choose an optimum coating thickness for a mirror in a scanner depending upon whether the incident light beam is an S-polarization beam *or* a P-polarization beam. In this regard, the Brandt patent discloses an optical scanner 10 that scans a light beam 50 on the surface of a receiving medium 24 as illustrated in Figure 1 therein. If the light beam 50 is an S-polarization beam, Figure 5 provides the reflectance of a coated mirror as a function of the coating thickness for incident angles of 15, 30 and 45 degrees for a wavelength of 670 nm. If the light beam 50 is a P-polarization beam, Figure 6 provides the reflectance as a function of the coating thickness for incident angles of 15, 30 and 45 degrees for a wavelength of 670 nm. (col. 6, lines 26-39). With regard to Figures 5 and 6, the Brandt patent also discloses that plots of reflectance versus coating thickness for polarized light beams incident on a coated mirror at angles of 15, 30 and 45 degrees tend to converge or cross at particular thicknesses T1 of the coating, and that the regions of convergence indicate an optimal coating thickness to minimize reflectance variations with angle of incidence (col. 6, lines 40-47). For S-polarization light, Figure 5 indicates an optimal coating thickness of about 180 nanometers (col. 6, lines 48-54). In contrast, for P-polarization light, Figure 6 indicates an optimal coating thickness of about 70 nm.(col. 6, lines 55-59). Thus, as disclosed in the Brandt patent, the use of S-polarized light is separate from the use of P-polarized light — there is no disclosure or suggestion of using S-polarized light and P-polarized light together. In fact, with regard to the calculations of the reflectances for Figures 5 and 6, the Brandt patent explicitly states that the incident radiation is assumed to be either S-polarization or P-polarization (col. 7, line 1).

If, *arguendo*, a hypothetical multi-beam scanner using S-polarization were prepared according to the Office's suggested modification based on the information in the Brandt patent, one skilled in the art would reasonably choose a coating thickness of about 180 nm for that apparatus based on Figure 5 and the disclosure at col. 6, lines 49-54. Such a device would not satisfy claim 1 at least because the reflectance at 45 degrees for S-polarized light at a coating thickness of 180 nm (about 0.895 from Figure 5) is more than 3% greater than the reflectance at 45 degrees for P-polarized light at the same coating thickness (about 0.856 from Figure 6). This difference is apparent from the calculation data plotted in Figures 5 and 6, which one skilled in the art would reasonably assume to be accurate.

In addition if, *arguendo*, a hypothetical multi-beam scanner using P-polarization were prepared according to the Office's suggested modification based on the information in the Brandt patent, one skilled in the art would reasonably choose a coating thickness of about 70 nm for that apparatus based on Figure 6 and the disclosure at col. 6, lines 55-59. Such a device would also not satisfy claim 1 at least because the reflectance at 45 degrees for S-polarized light at a coating thickness of 70 nm (about 0.884 from Figure 5) is more than 3% greater than the reflectance at 45 degrees for P-polarized light at the same coating thickness (about 0.847 from Figure 6).

In summary, the Brandt patent is concerned with obtaining relatively uniform reflectance across a range of reflectance angles for a *given* type of polarization. It is not directed to the problem addressed by the present invention, namely substantially uniform

reflectance for *plural* types of polarization. As such, its teachings would not lead one of ordinary skill to the claimed solution to that problem.

Accordingly, Applicants submit that claim 1 is not obvious in view of the Brandt patent for at least the above-noted reasons. Withdrawal of the rejection and allowance of claim 1 are respectfully requested. Claims 2-4 are indicated in the Office Action as containing allowable subject matter. Given that claim 1 is believed to be allowable, it is believed that claims 2-4 are allowable as presently written (i.e., it is not necessary to write claims 2 and 4 in independent form).

In addition, Applicants respectfully submit that independent claim 13 is not obvious in view of the Brandt patent. Claim 13 recites an optical scanner comprising, *inter alia*, a light source for emitting a plurality of light beams in which a polarization direction of at least one of the light beams is different from polarization directions of the other light beams, and an optical surface provided between the light source and a surface to be scanned in the optical paths of the light beams, the optical surface having a reflectance for s-polarized light and a reflectance for p-polarized light that are substantially the same at a predetermined incident angle to the optical surface. In contrast, as noted above, even if the Office's suggested modification of the Brandt patent were made, *arguendo*, the resulting hypothetical apparatus would have a light source wherein all beams have the same polarization. In addition, the resulting hypothetical apparatus would not have an optical surface having a reflectance for s-polarized light and a reflectance for p-polarized light that are substantially the same at a predetermined incident angle to the optical surface for reasons set forth above with regard to claim 1. Withdrawal of the rejection against claim


13 and allowance of the same are respectfully requested for at least these reasons. Claims 14, 15 and 23 are allowable at least by virtue of dependency.

In addition, Applicants respectfully submit that independent claim 24 is not obvious in view of the Brandt patent. In this regard, Applicants respectfully submit that similar distinctions exist between the subject matter of claim 24 and that disclosed in the Brandt patent as have already been discussed for claim 1 above. Accordingly, Applicants submit that claim 24 is not obvious at least for reasons set forth for claim 1 above. Withdrawal of the rejection and allowance of claim 24 is respectfully requested.

In light of the foregoing, withdrawal of the rejections of record are respectfully requested so that the present application may pass to issuance. Should there be any questions in connection with this application, the Office is invited to contact the undersigned at the number below.

Respectfully submitted,

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